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## The Diverse Roles of Hydrogel Mechanics in Injectable Stem Cell Transplantation.

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### Public Summary:

Stem cell delivery by local injection has tremendous potential as a regenerative therapy but has seen limited clinical success. Several mechanical challenges hinder therapeutic efficacy throughout all stages of cell transplantation, including mechanical forces during injection and loss of mechanical support post-injection. Recent studies have begun exploring the use of biomaterials, in particular hydrogels, to enhance stem cell transplantation by addressing the often-conflicting mechanical requirements associated with each stage of the transplantation process. This review explores recent biomaterial approaches to improve the therapeutic efficacy of stem cells delivered through local injection, with a focus on strategies that specifically address the mechanical challenges that result in cell death and/or limit therapeutic function throughout the stages of transplantation.

### Scientific Abstract:

Stem cell delivery by local injection has tremendous potential as a regenerative therapy but has seen limited clinical success. Several mechanical challenges hinder therapeutic efficacy throughout all stages of cell transplantation, including mechanical forces during injection and loss of mechanical support post-injection. Recent studies have begun exploring the use of biomaterials, in particular hydrogels, to enhance stem cell transplantation by addressing the often-conflicting mechanical requirements associated with each stage of the transplantation process. This review explores recent biomaterial approaches to improve the therapeutic efficacy of stem cells delivered through local injection, with a focus on strategies that specifically address the mechanical challenges that result in cell death and/or limit therapeutic function throughout the stages of transplantation.

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